SEPTEMBER 1974

DRIVER

DRIVER IN EUROPE

BUYING A CAR ABROAD

OPINIONS

NEW CAR TIME!

the 75s

BEAUTIFUL DOWNTOWN MADRID

DRiVER
1975
1975
1975

The first thing buyers of 1975 cars are going to learn is that they have a special pump at gas stations. The 1975-model engines must be operated on unleaded fuel because of the new emission control devices required by tougher federal emission standards.

These devices—which are catalytic converters—accelerate the oxidizing process and reduce most of the unburned hydrocarbons and carbon monoxide to water vapor and carbon dioxide gas.

The unleaded gas is necessary because lead contamination of the catalyst can destroy this conversion efficiency. Best judgment now is that converters will contaminate beyond recovery if two or three tanks of leaded fuel are burned consecutively,

continued

Emphasis is on pollution control and fuel economy, but a few new features will contribute to safety

THE '75s

DRIVER

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

SEPTEMBER 1974

VOLUME 8 NUMBER 4

CONTENTS

FEATURES PAGE

The '75s 1
Buying A Car Abroad 8
An Air Force Record-Setter 18

DEPARTMENTS

Double Clutch 2
Opinions 12
The Backyard Mechanic 22
Backfire 26
Tuneup 29
Miss DRIVER ..... Back Cover

DEPARTMENT OF THE AIR FORCE · HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Maj Gen DONALD G. NUNN
The Inspector General, USAF

Maj Gen RANALD T. ADAMS, Jr
Commander, Air Force Inspection and Safety Center

Brig Gen CHARLES E. YEAGER
Director of Aerospace Safety

PUBLISHED IN COOPERATION WITH THE DEPARTMENT OF THE ARMY AND THE DEPARTMENT OF THE NAVY

Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM RICHARD E. RUMBLE
Commander,
Naval Safety Center

Maj GARY I. SEMONES
Chief, Safety Education Division

Capt. TOBIAS van ROSSUM DAUM
Editor

VIRGINIA HENDRIX
Managing Editor

Sgt BOB KAYS
Technical Editor

DON KELLEHER
Art Director

MSgt BILL FOSTER
Staff Artist

MSgt MIKE KEEFE
Staff Photographer

ALICE MILKEY
Editorial Administration

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THE EDITOR SPEAKS

DOUBLE CLUTCH

PROFILE OF THE AIR FORCE CYCLIST

Because DRIVER makes its home in the Air Force Inspection and Safety Center, we have the privilege of seeing much of the management-level work being done in the Air Force to promote traffic safety. Recently we looked over the results of a survey made last summer of 18,000 airmen and 7,200 officers that gives a kind of profile of the Air Force motorcyclist, and we thought you might find it as interesting as we did.

- One of every three airmen either owns a cycle or has firm plans to get one in the next few months.
- About the same ratio would like to have special training in operation of a motorcycle.
- More than 60% of the motorcylists use their machines for both recreation and transportation and rack up more than 5,000 miles a year. Miles are about equally divided between city and rural riding, but only 14% reported much freeway riding; 28% ride off the road.
- There was no clear-cut preference for a specific type of motorcycle, although the 250-399 cc class was most popular by a slight margin.
- One of every four USAF officers either owns a motorcycle or plans to buy one in the next few months. Officers' responses differed from airmen's significantly in only one area —more officers belong to motorcycle clubs.
- Almost everyone reports using helmets and face shields or goggles and most wear boots. Only half the

continued on page 28

NEXT MONTH
Reviewing the Basics

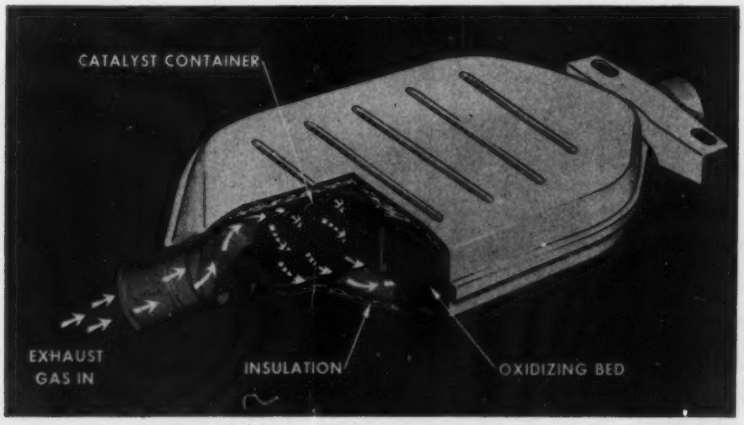


Fig. 1

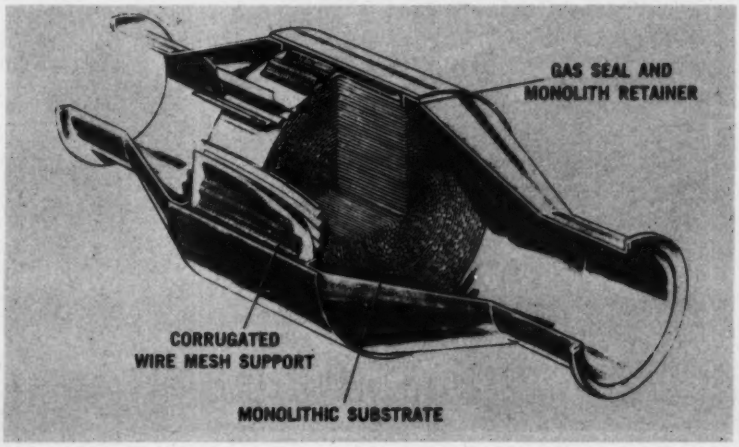


Fig. 1A

but that lesser quantities will "wash" with a return to no-lead fuel.

The catalytic agent is platinum in combination with other of the so-called "noble elements." Some catalysts feature monolithic construction, others use a beaded or pelletized catalyst (Figs. 1 and 1A). Those manufacturers using converters with a canister system point out that if contamination occurs, the platinum-coated pellets could be removed with a special tool.

The catalytic converter is expected to be good for from 50,000 miles to the life of the car and should require no maintenance. It has no moving parts.

The new cars will be protected from accidental introduction of leaded fuel by a change in filling station pumps. Pumps dispensing completely unleaded fuels will have new fuel filler nozzles. By government direction, these new nozzles will be smaller in diameter than those used for other gaso-

continued

Fig. 2

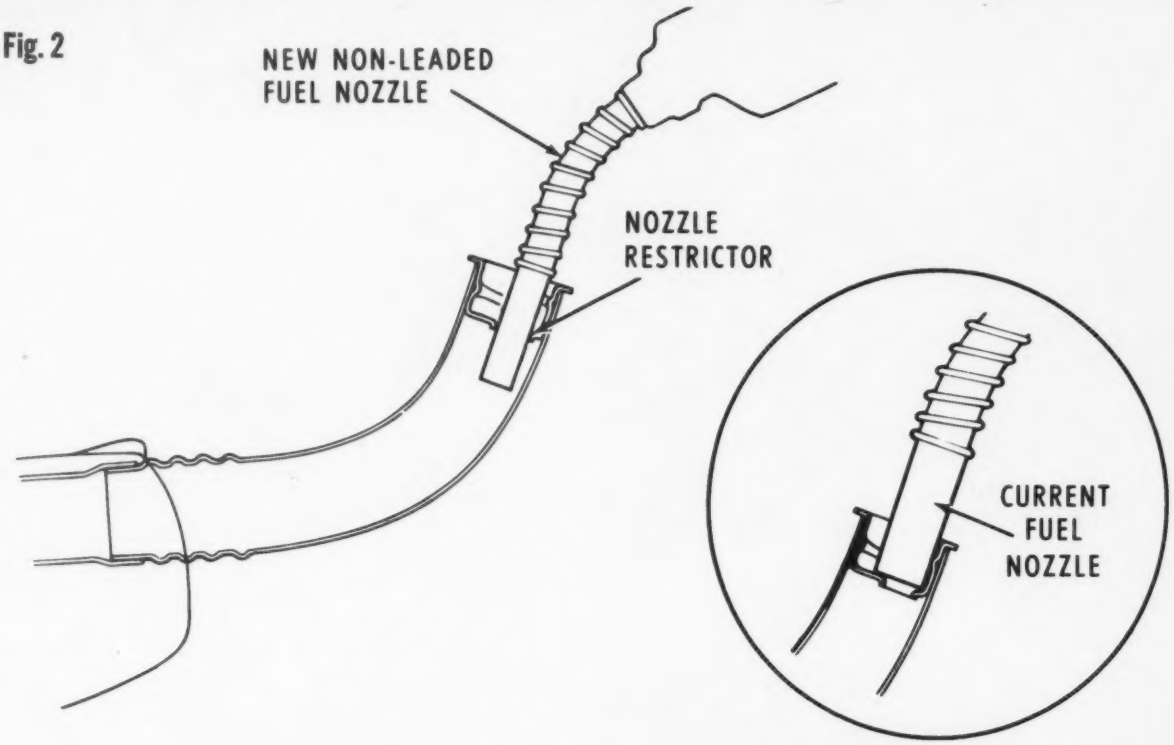
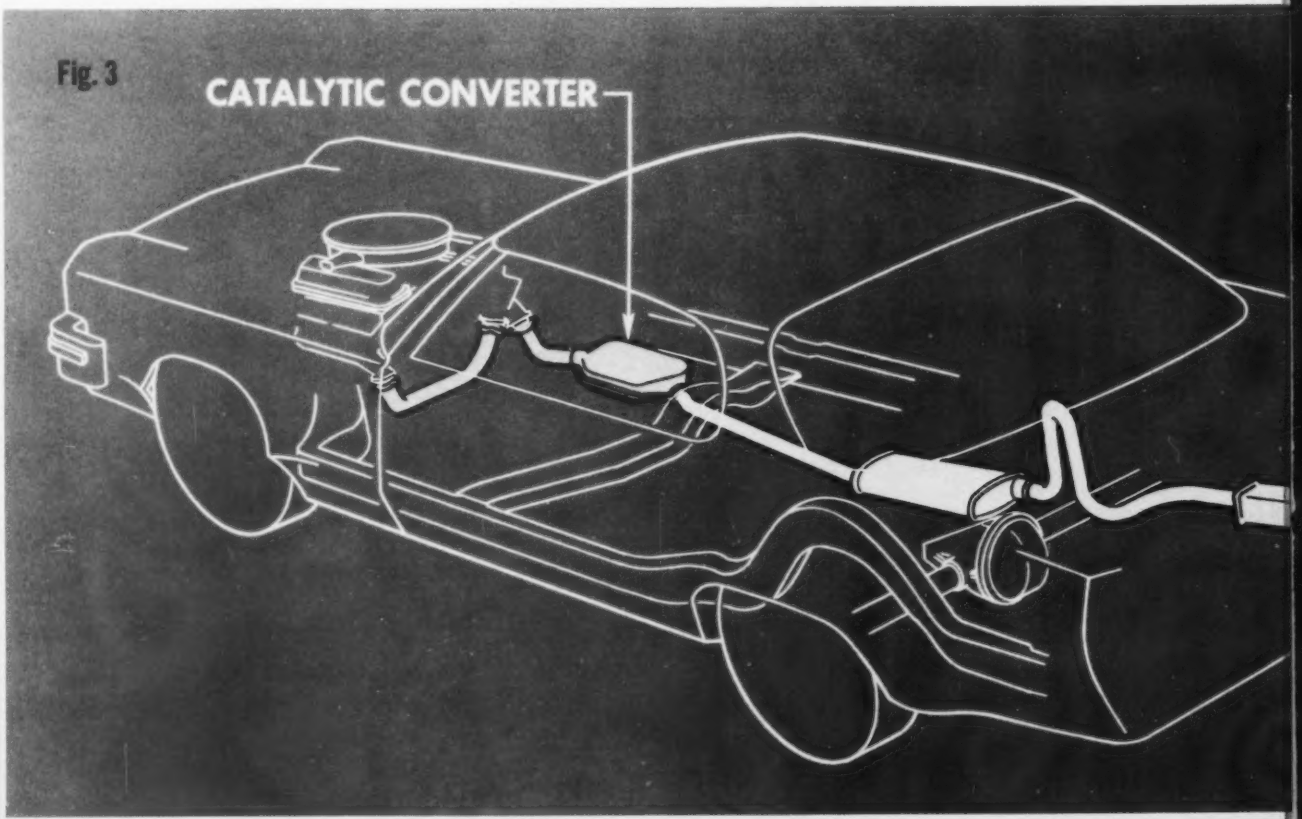
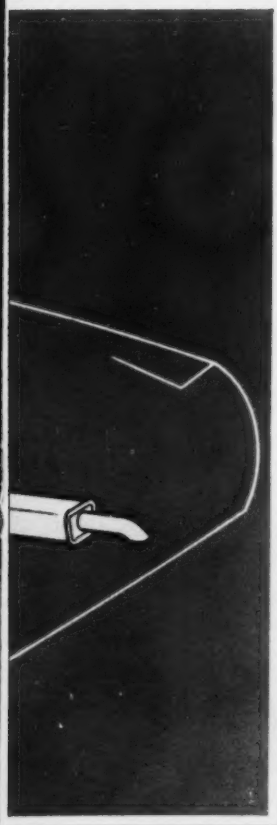

NEW NON-LEADED
FUEL NOZZLE
NOZZLE
RESTRICTOR
CURRENT
FUEL
NOZZLE

Fig. 3


CATALYTIC CONVERTER



lines. To correspond with the non-leaded fuel nozzles, the '75 cars will have different fuel filler necks with some sort of restrictor to prevent entry of nozzles from the wrong pumps (Fig. 2).

Since unleaded gas is not expected to be widely available outside the United States, most manufacturers will produce export models not equipped with the converter.

Though there should be no problem in engine performance of 1971 and newer vehicles operating on unleaded fuel, there is some as yet unresolved controversy as to the effects of no-lead 91 octane fuel on older model vehicles. The Army has tested no-lead fuel in its vehicles with no bad effects and plans to totally convert to this type.

Air Force tests on older vehicles showed substantial knocking occurred which could not be tuned out. Therefore, although it has been proposed that Air Force convert totally to no-lead, a final decision has not been announced.

HOW ABOUT MILEAGE?

The catalytic converters are very sophisticated devices which are part of the car's exhaust system. (Fig. 3). They *chemically* detoxify auto emissions after they have been created in the engine.

By contrast, the antipollution devices we have been using in the past involve changes in the engine so fewer pollutants are formed in the first place—techniques which also reduce fuel economy.

As a result, catalyst designers have claimed that their system will result in improved gasoline mileage because engines can be tuned for optimum fuel economy instead of low emissions. This appears to be true since most manufacturers are advertising from slight to major gains in fuel economy and engine performance.

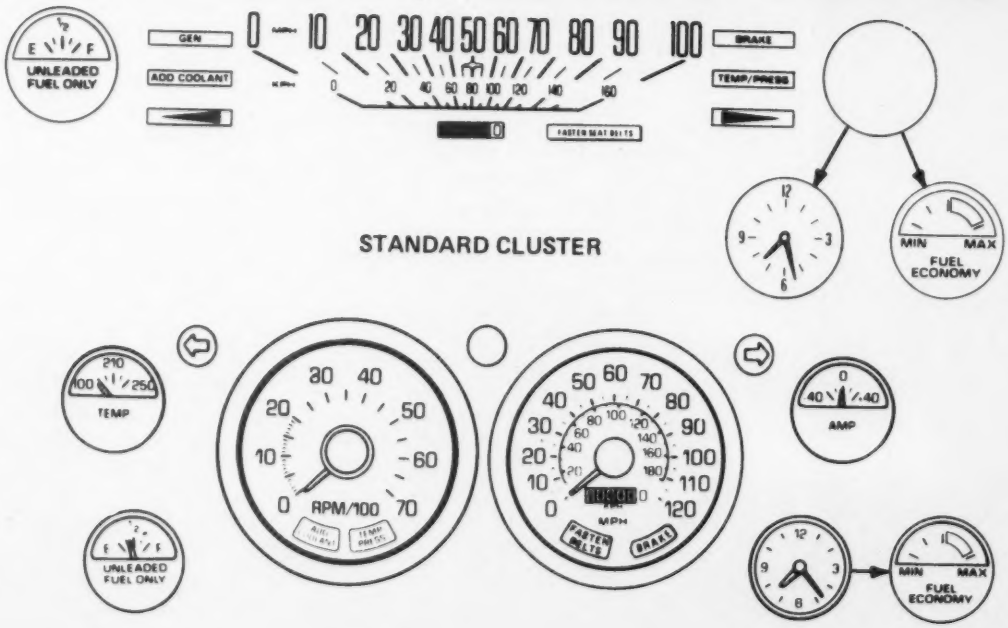
However, auto pollution standards for 1975 cars sold in California are 35% to 40% tougher than those imposed on cars to be sold in the other 49 states. Therefore some models sold

continued

Fig. 4

MIN
MAX
E
F
FUEL ECONOMY
UNLEADED FUEL ONLY

Fig. 5


UNLEADED FUEL ONLY
GEN
ADD COOLANT
0 10 20 30 40 50 60 70 80 90 100
BRAKE
TEMP/PRESS
FASTEN SEAT BELTS
MIN MAX
FUEL ECONOMY
STANDARD CLUSTER
TEMP
RPM/100
MPH
AMP
FASTEN BELTS
BRAKE
UNLEADED FUEL ONLY
MIN MAX
FUEL ECONOMY

in California will have additional changes in the engine which probably will offset any fuel economy gained by going to catalysts in the first place.

BIGGER CARS?

The manufacturers seem to believe that the American infatuation with the very small car is about over and that the action will be at the upper end of the small car market. Sales this past summer seemed to bear this out. Larger cars and recreational vehicles were selling fast, while inventories of very small cars were mounting.

Strictly from the safety standpoint, the experts are pleased to see less emphasis on minis and subcompacts simply because a somewhat heavier car gives you more protection in a crash. Design engineers are working feverishly to change this, but so far it is still true. If you are serious about safety and also about fuel economy—and we all should be because the energy crisis is real—safety specialists suggest you go with the intermediate or large compact and the smallest engine recommended by the manufacturer.

FEATURES OF INTEREST

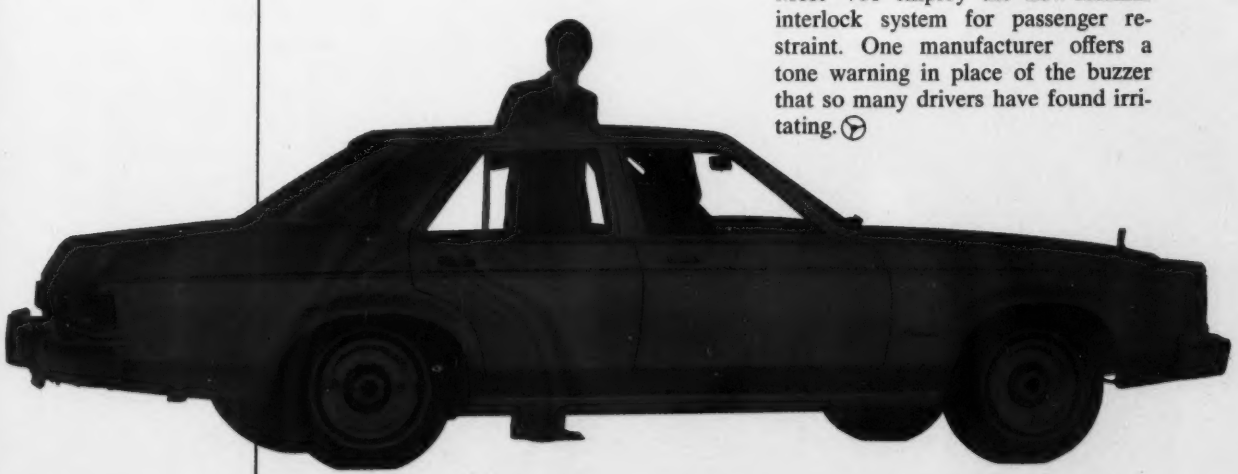
Vacuum Instruments: Several manufacturers are offering an engine vacuum instrument as part of the gauge panel so the driver can achieve maximum fuel economy by keeping the needle in the green (Fig. 4).

DRIVER's Backyard Mechanic encourages all of us to install a vacuum gauge in our present cars, not only so we can drive for best mileage but also because the vacuum gauge offers much information about the condition of the engine for those who will learn to read it. (See "The Amazing Vacuum Gauge," September 1973 DRIVER.)

Coolant Temperatures: Somebody has been hearing all those complaints from motorists about needing information *before* the overheat condition actually exists. A new coolant low-level warning light indicates a condition of one quart low, providing a warning before the high-temp warning light comes on (Fig. 5).

Speedometers: As an introduction to the upcoming switch to the metric system, many American '75s will have speedometers calibrated in both miles-per-hour and kilometers-per-hour. It is also interesting to note that many of the new instrument graphics have a speed scale of 0 to 100 mph instead of the former 0 to 120 mph.

Restraint Systems: Air bags or cushions are an option on a few luxury cars, as they were last year, for front seat passenger protection in frontal collisions. Lap belts are still necessary for protection in non-frontal collisions in '75s equipped with air cushions but shoulder belts are not required. Most '75s employ the now-familiar interlock system for passenger restraint. One manufacturer offers a tone warning in place of the buzzer that so many drivers have found irritating.



GENERAL MOTORS
GENERA

BUYING A CAR ABROAD

What the service member should know

Some people describe our relationship with the automobile as a sort of protracted love affair. If this is the case, there's no doubt that where this affair starts, and where love is at its blindest, is at the buying stage.

It's awfully hard to keep a cool head under the pressures of professional salesmen and to select the car and the sensible options that you **really** want. It can be even harder overseas, because the new car sales office you visit will probably house representatives from all the major U.S. auto companies while in the civilian community are the European car dealers who would be equally interested in capturing your business.

We certainly can't tell you how to keep a cool head when buying a car. That would take some of the fun out of it, anyway. But what we will do is provide you with some practical information about buying a car at your overseas assignment that can save you confusion, frustration, and money.

As a result, maybe you will be more free and in a better state of mind to look into considerations that DRIVER feels are important in selecting a car: handling characteristics, stopping ability, restraint system convenience, visibility, suitability to the driving environment, and economy.

EUROPEAN CARS

Purchasing a European car in Europe is just not the bargain it used to be. The picture has been changed by measures to stem the gold flow, as well as dollar devaluations and increased shipping costs. This is not to say that you still can't come out a little bit ahead by buying a European car in Europe instead of the U.S., but it will be a slim margin if you do. Here are some things you should know:

- You must pay the government to ship home your European-manufactured-and-purchased car, or ship via a civilian company at even higher cost. Government shipment is on a space-available basis—a medium-sized car costing about $250. (Current proposals are to double the rates.)
- For import to the U.S., the car must meet all current U.S. safety and emission standards. Be sure to order your car to these specifications, making certain it will meet the stricter California emission requirements if it is to be licensed in that state.
- Any service member stationed in Europe under the NATO status-of-forces agreement may purchase a European car tax-free through the Canadian Forces Base, Europe (CFBE) exchange system. Included are motorcycles, trailers, and late-model used cars. The CFBE paperwork processing fee for new cars is $35; $20 for a trailer or motorcycle. The tax saving in Germany is 11%. In addition, car buyers can sometimes get direct discounts from the dealers when purchasing through CFBE. Mercedes gives a 6% discount, VW and Audi, 5%.
- The European Exchange System (EES) does not sell European cars. Therefore, the buyer must find a dealer selling the car he wants who is under contract to CFBE. Such dealers are often located near major U.S. military installations. If problems arise finding such dealers, the buyer may obtain assistance from the CBFE Automobile Transaction Office at Lahr (Telephone 07821-2654).
- Buyers are advised to shop around to compare prices before making a purchase, in order to obtain the best price.
- Whether you are buying a used European car or used American car you would be wise to obtain an expert's opinion on its condition and value. Germany has excellent diagnostic centers where you can obtain unbiased appraisals. They are called Deutsche Automobile Treuhand Gmbh (or, "D.A.T.") and there are probably several in your area if you are assigned to Germany. If stationed outside Germany, contact the auto clubs in your host country for the location of your nearest appraisal point.
- Before you sign any contract, read it thoroughly and have it checked over by your legal assistance officer. This could save you hundreds of

continued

dollars should you choose to cancel your order.

AMERICAN CARS

The setup for buying a new U.S. automobile at your overseas assignment is very convenient. And, if you buy at the right time, you stand to realize a savings over what you would pay for the same car purchased stateside.

Each major military installation in Europe has an EES new-car sales office with sales representatives from GM, American Motors, Ford, and Chrysler. Some locations even have new cars on display, demonstrators, and a limited stock of cars that can be delivered in 4 to 5 days (see photo above).

Before bounding into the EES sales office to make a purchase, however, it would be smart to bone up on an EES booklet entitled "New Car Sales Program." Here you'll find vital information including how to place an order, delivery time, special ordering from the manufacturers, stateside delivery, financing, insurance requirements, and so on. Meantime, here is some general information that could prove of value.

If you come overseas without having the government ship your car, you are entitled to have a new U.S. car shipped to you and returned stateside when you rotate home.

■ Overseas exchange customers receive a discount from the manufacturer's suggested retail price (see Fig. 1), and in most cases on accessories and optional equipment. It is important to realize, however, that it's possible to beat these prices when buying from stateside dealers late in the model year. This is because stateside dealers gradually cut prices as the

European Exchange System New Car Sales Offices are located on every major military installation. Here buyers can arrange the purchase of any major U.S. auto company's cars. The office shown is at Torrejon AB, Spain.

EES sometimes has demonstrators and display lots. European cars are not sold through EES, but can be bought tax-free through the Canadian BX system.

EES maintains a limited stock of cars at Bremerhaven. If you select one of these, it can be delivered in five days for a charge of $150. Delivery from the U.S. takes about 90 days.

model year wears on and in September sometimes will sell at or near the price they paid the manufacturer, to make room for new models. The EES discount remains constant throughout the year.

■ Because of the extremely high accident rate in Europe, insurance prices are steep for all cars. New car buyers should find out what they will have to pay for insurance before they buy a particular car so they do not overextend themselves financially. It's advisable to keep arrangements for your auto insurance separate from purchase of the car. Dealer-arranged insurance is very expensive.

Recently it has been possible for U.S. drivers to obtain insurance through certain German companies at a much cheaper rate than with U.S. companies. Insurance rates are most favorable with these companies for low-horsepower cars, and for drivers with claim-free records (another reason to drive carefully). Servicemen can get detailed information about German insurance by obtaining the three-part STARS and STRIPES in-depth report on the subject which appeared in May 1974.

■ Credit Unions offer a more favorable financing rate than do dealers.

EES DISCOUNT ON NEW CARS

(off manufacturer's list price, F.O.B. Detroit)

Subcompacts	15%
Compacts/Intermediates	10%
Full size	18%

Fig. 1

Selection of a new car is a major decision and one of the more expensive purchases most of us make during our lives. Cost of insurance, fuel, and upkeep should also be considered when deciding if you can afford the car you select.

DRIVER likes to know what you people are thinking about cars and cycles and allied subjects. So whenever we get the chance, we go out and ask questions, and print the better interviews.

By sharing these interviews with you in DRIVER we hope to provide insight into fellow drivers' beliefs and attitudes, and cause you to re-examine your own.

This month's "Opinions" is a special one involving service people stationed in Europe where drivers and driving conditions are quite different than what we are accustomed to. We hope you find it interesting.

OPINIONS

What is "different" about driving in Europe?

In the States you can pretty well predict what the other driver is going to do—over here you can't. For example, it's not unusual to have someone make a right-hand turn on a four-lane street from the far-left lane—without signalling.

In Spain a lot of drivers have been driving less than ten years and don't have the benefit of the training we get in the U.S.

Sgt Ralph Muson, USAF,
Info Specialist
Assignment: Torrejon AB, Spain
Home: Reynolds, Illinois

People drive faster over here, and are not as courteous as in the U.S. You see a lot of tailgaters and impatient drivers.

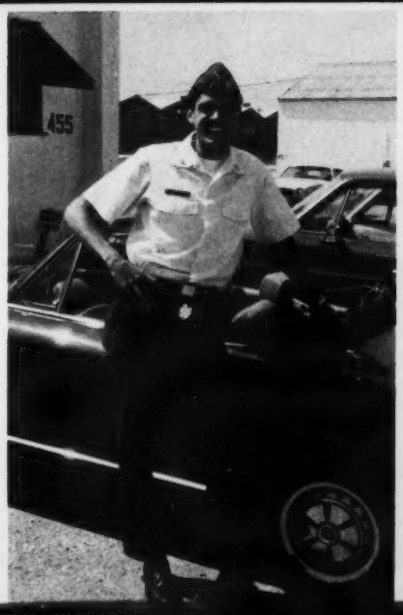
There are more gas stations bordering the highways and they are easily accessible.

SP4 Marie H. Stotts, U.S. Army,
Communications Specialist
Assignment: Bremerhaven, Germany
Home: Los Angeles, California

Drivers' attitudes here are different. They are more aggressive, and do not practice defensive driving techniques.

Basically, Europeans are more casual in their daily lives than we are. But when they get behind the wheel —that's a different story.

Capt Rix C. Patton, USAF,
Explosives Safety Officer
Assignment: Torrejon AB, Spain
Home: Long Beach, California



Driver attitudes over here are particularly different. For example, in the States they don't tailgate you nearly the way they do over here.

Then there are the narrow streets. This is because they were built who knows when, and weren't designed for automobiles. Often you have to climb the curb with your car to make it past another car coming the opposite way.

I have a Morris Mini 1275 GT which is about half the size of an American car and the narrowest car over here. Even with it I have to climb the curb in towns such as Cambridge. But with a large U.S. car you have to pull all the way up on the sidewalk—if you can make it by at all.

The biggest hazard in England has to be the roundabout [traffic circle]. Although the car on the right is supposed to yield, you can't take your right-of-way for granted or you won't last long. So it becomes a matter of getting into the traffic when there's an opening. It takes good judgment.

continued

SSgt Robert W. Barth, USAF,
Vehicle Operator/Dispatcher
Assignment: RAF Mildenhall, England
Home: Youngstown, Ohio

Sgt. Munson

SP4 Sttots

What adjustments have you made to the way you drive since coming overseas?

I drive slower—you have to because the roads here are not as good as in the States. You have to concentrate more—which is hard to do because the girls are so pretty. But if you let yourself get too distracted and do a lot of head-swiveling, you're going to get in trouble.

I have learned to always stop when I see a light go from green to yellow because many local drivers barrel through.

Another thing is to make sure you have enough gas before you go out driving at night because German stations close early in the evening—usually at dusk. There are very few overnight stations, especially in less-populated areas.

What advice do you have for the driver coming overseas for his first tour?

Make sure you know the rules of the road before you go driving. Don't jump in your car and go downtown the first day you get here.

The European road sign system is very logical, but it takes time to get on to it. Like, in a no-passing zone the only indication is a sign with a black car and red car. Somehow you expect more of a warning.

My advice is to use your car's rear-view and side mirrors constantly, and let the tailgaters get by.

Watch for drivers who barrel past you when you've stopped on the highway for some problem or obstacle up ahead.

If you want to buy a new car while you are in Europe, I would suggest you wait until just before you go home because the roads here are bad and cause wear and tear on your car.

Be prepared to pay high insurance rates, especially if you are an unmarried GI under 25. For example, liability alone is $365 on a '62 VW bug. And with a new car you have to have full coverage as required by the loan company.

What qualities do you look for in a car that would best suit it for European driving?

It's got to be a small car with good performance, and good mileage. The big American cars just aren't suited for European driving.

If you like to village-hop, which most people get into, you get onto roads where the big car just won't make it. The alleys are just too narrow—or the road really rutted out.

If you're coming over here—unless you already have a car—the thing to do is buy one here. You can buy a Seat [the Spanish version of a Fiat] for relatively little, then sell it when you leave for almost what you paid for it. Then you can buy an American car when you get back to the States, or buy a European sports car to ship back. I just wouldn't advise bringing an American car over here.

There is a big problem with parts for U.S. cars. There is a minimum three-month wait, plus the parts cost twice as much because of a 100% import tax in Spain. So if you break down, it's expensive, plus you will be walking a long time before the car's fixed.

But with a Seat, parts are available and cheap, and so is labor.

I look for good gas mileage, and low maintenance costs. Dependability is also important—like will the car start in zero-degree weather?

Capt Patton

SSgt Barth

I drive much more defensively, rather than trying to change my driving to be like the Europeans.

Because you don't sense the presence of policemen here as much as in the states, you can tend to become more reckless in your driving. I avoid letting this happen, and am especially more careful in congested traffic.

You have to be especially alert and defensive, especially at intersections. It seems like everybody is gunning for you whenever you go out—so you've got to be careful.

As far as driving on the left goes it's a matter of what kind of car you drive. If you ship an American car over here you are going to have problems. When you start to pass, unless you have a passenger in the right seat you are going to have to lean way over toward the other side of the car to make sure it's clear to pass. If you're passing a truck—forget it.

A lot of guys around here will pass a truck only to find a truck coming in the opposite direction. As a result there are a lot of U.S. cars in a junk yard near a roundabout here. And, if you want to buy a left-hand fender for an American car, you have it made. But you have a hard time finding any right-hand fenders. Just go around the base here and you'll see how many right fenders are dented.

I strongly recommend the base driver's orientation course. Watch the films and get a "feel" for driving in Europe. Of course, you have to also experience the driving, but the film gives you a strong visual message about driving over here.

Take it easy on the road. Don't fall into the habit of doing what you see other drivers here do such as tailgating and passing at intersections, where it's blind, or on curves. Keep a good following distance and don't speed. We have "black ice" here and a problem with drivers who speed into corners then spin out because of the ice.

If you're coming to Europe, don't bring a large car over here. You'll be at a disadvantage because of the narrow streets, and the lack of maneuverability.

I want a car that has adequate power for passing, plus good stopping ability—which means disc brakes. If you buy a car over here not to U.S. specs it won't have safety glass. If you break the glass be sure you do replace it with safety glass.

A lot of people think that if you have a big car the less likely you are to get hurt. They think if you have a small car you'll get creamed. But I don't feel this way. A lot of it has to do with driver attitude—practicing defensive driving.

They come down on people who have sports cars, but a person who can drive one well can get out of a lot of bad situations because of the extra maneuverability.

Sgt. Munson

SP4 Sttots

How do you feel about safety belts?

You've got to wear them. I had a blowout on wet pavement here and the car did a few "wally-bangs" and I was able to keep it under control. But if I didn't have my seat belt on I would have been thrown out (my car is a small convertible).

I think for the minor inconvenience you have to wear them.

I never wear them—I'd rather be thrown out than jammed in case of an accident. It depends on how you look at it. My life was saved once because I wasn't wearing my belt, but, on the other hand a girlfriend died because she wasn't wearing hers.

I definitely think children should wear them so the driver can concentrate on driving instead of trying to keep the children from being thrown forward during sudden stops.

OTHER COMMENTS:

The police in Europe are your best friend. In Spain they are the most efficient, best educated, most courteous police I've ever seen. They'll do anything for you. There've been cases when the Guardia Civil [like State Troopers] have dismounted their motorcycles to push a car that has run out of gas a mile to a gas station.

But if you give them any sort of a hassle, they'll do the job on you. So if you're stopped for a ticket over here be courteous, and if you don't understand what they are telling you, say so—but don't be rude, argue with them, or give them a hard time. Cooperate with them and you'll have no problem.

The train system here is great and always on schedule! So I make all my longer trips by train or take military hops. It's a very convenient way to travel.

I put a bumper sticker on my car that I wrote myself. It says (in both German and English), "Drive safely, the life you save may be mine."

Capt Patton

SSgt Barth

I believe in them and I use them. I drive a small sports car which doesn't have the protection afforded by a large car so I feel it's especially important to use seat belts.

I wouldn't drive without using them. I didn't use them much in civilian life, but being a military vehicle driver I became oriented to them. At first it was because of the Chief of Staff ordering me to wear them. This made an impression. And, unlike some others, I was interested in the Air Force safe driving classes which reinforced the habit.

By the way, there is no requirement for cars manufactured over here to have catches to keep the front seats from tilting forward. So this is another reason to use seat belts, because in a wreck the seat can fly you through the windshield.

I recently came from an assignment in Turkey. If you drive over there you've got to realize that the people have not really adjusted to the automobile. It's not that they mean to be reckless, it's just that they aren't aware of what the consequences of an accident can be.

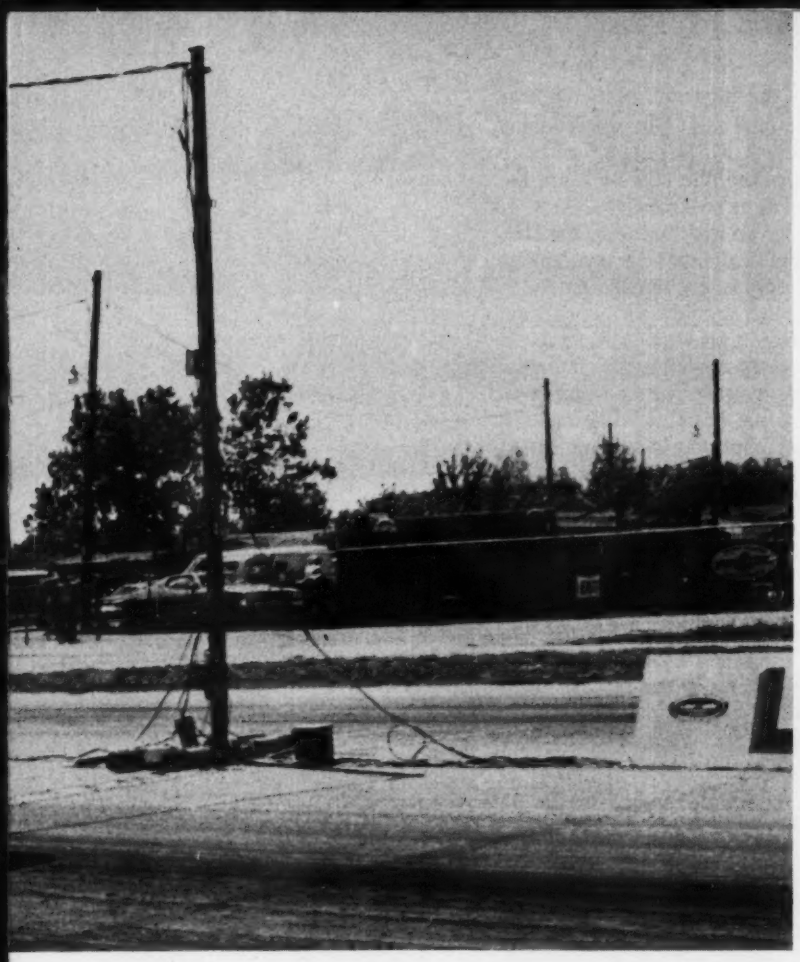
I think more people should be open-minded about safety programs the Air Force has because they can do a lot of good.

AN AIR FORCE

Fred Elsass—Happy after his engine is certified legal by the NHRA and he is the official record holder.

A 1965 Chevrolet Biscayne with less than 200 horsepower and an automatic transmission is not quite the car most people picture as a record-setting dragster. But that's exactly the car TSgt Fred Elsass figured he'd need to fulfill a lifelong dream of setting a national drag racing record. Elsass had it figured pretty close—he's set three records in the last year with his 283 cu. in.-powered Chevy.

The Dyess AFB-based NCO blames his obsession with setting a national record on the fact that while racing way back in 1960 he was severely trounced by a national record holder. From that day on, Elsass had a goal of holding a record. His dream came true in April of 1973 when he



Elsass's record-setting 283 cu. in. Chevy —on his way to an NHRA R/Stock Automatic record at La Place Dragway, Louisiana.

RECORD-SETTER

set the International Hot Rod Association (IHRA) R/Stock* top speed and elapsed time (ET) records. At that time we featured Sergeant Elsass in our first "In the DRIVER's Seat" in the Nov '73 DRIVER.

Since appearing "In the DRIVER's Seat" Elsass has cracked another record—this time the National Hot Rod Association (NHRA) R/Stock Automatic ET record. And because of his consistent performances on the strip, he is currently tied for his division's stock eliminator points lead and has guaranteed himself a trip to the world finals in October—competing in the finals is the dream of every drag racer.

Obviously a lot of work goes into setting a national record. Elsass doesn't really keep track of the time but does estimate that 90 percent of his time around the car is spent wrenching, while only about 10 percent of the time is actually competing. But a surprising amount of brain work is required to come up with a winning combination for the strip—this is especially true in the competitive stock eliminator class Elsass runs.

The 12-year AF veteran chose to pursue a national record in the stock class primarily because of the cost. Elsass told us that since the cars must be kept basically stock and the parts have to be bought over the counter, the cost of competing stays down. But the class is surprisingly competitive because everybody is working with about the same equipment and nobody can out-dollar you. So the real brain work comes in trying to determine what is the best combination of engine and body that falls within the resrictions of the class.

"A lot of people are kind of surprised by my rather nonracey car—especially if they're not too familiar with the stock class and they're thinking more in terms of a 'funny car,' " Elsass said. "But a lot of research went into choosing that particular car. The car was chosen specifically for its weght—it's about the lightest car that is legal for R/Stock.

"But since the engine is essentially stock, the way you really get the performance is through tuning and precise preparation," Elsass added.

DRIVER recently got a chance to see the results of Elsass' precise preparation when we accompanied him to NHRA World Championship Points Meet. Along with determining who will be invited to the Worlds Finals by virtue of their performance at these meets, points meets are one of the few times new national records can be established. And a new record is exactly what Elsass had in mind.

But before Elsass or anyone else could get their car near the strip, it had to be thoroughly checked by NHRA technical inspectors. The inspectors checked to be sure the cars conformed to class rules—but primarily they were checking to be sure that the cars were equipped with the properly approved safety features. Many important safety innovations have come out of drag racing because of the great interest in safe competition on the part of the sanctioning bodies and the racers.

continued

Stock means the car must be kept primarily stock—the way it came from the factory. The letter—in this case R—is a further breakdown based on the horsepower-to-weight ratio.

continued

AN AIR FORCE RECORD-SETTER

Even though the tech reps had just inspected his car, the first thing Elsass did when we got to the pits was check everything once again. He told us that he always keeps his car perfectly prepared, but likes to be doubly positive before making a run —especially a record run where everything has to work right. We also noticed he was just as meticulous with his personal car. And for this reason he says he never has any trouble with his car—even when towing the race car.

Another procedure Elsass follows and recommends for all cars is watching the temp gauge closely while the engine warms. He watches to see that the needle rises steadily, then drops quickly indicating that the thermostat has opened and is not sticking shut.

After final preparation, Fred Elsass calmly went to the line and shaved .11 seconds off the existing R/Stock Automatic record to set the new mark at 15.89. Elsass explained that the car can go much quicker, but that the best strategy is to just lower the record a little bit at each meet because championship points are awarded each time a record is set. But after seeing what happens when a record is broken, we kind of wondered if it is even worth it.

For a national record to become official, the engine must be certified legal. And in the case of a stock category, this means almost a complete teardown so everything from valve surfaces to camshaft duration can be checked against the factory specifications. But during the teardown we saw exactly why Fred Elsass is a national record holder.

"I like to do things right," is how he explains the great care and precision he exercises when working on the engine. Elsass has complete checklists for every procedure and uses them to double-check every step. He also has a good supply of clean rags handy to keep removed parts spotless. As the sergeant-mechanic was doing the final assembly on his engine and smiling over its being certified legal, we asked him how he keeps the engine running so strong.

"There's no trick to it," he explained. "What I do to keep my engine running right is exactly what anybody else can and should do to keep their car running at peak efficiency. I simply stay on top of the regular maintenance, like ignition parts and oil. I do things by the book, I work cleanly, and most importantly I work supercarefully—and that's all that's really required."

Although Elsass's NHRA R/Stock Automatic record has been bettered, he was as enthusiastic as ever when we talked to him recently.

"You know, when I started this season," he said, "I told myself I'd be thrilled to finish in the top 10 in my division—right now I'm tied for first and barring unforseen problems I'll be at the world finals. I'll have my engine 'freshened up' and should be running about a half second faster than I am now. Going to the finals is the dream of a lifetime and I'll guarantee you I'll be running strong."

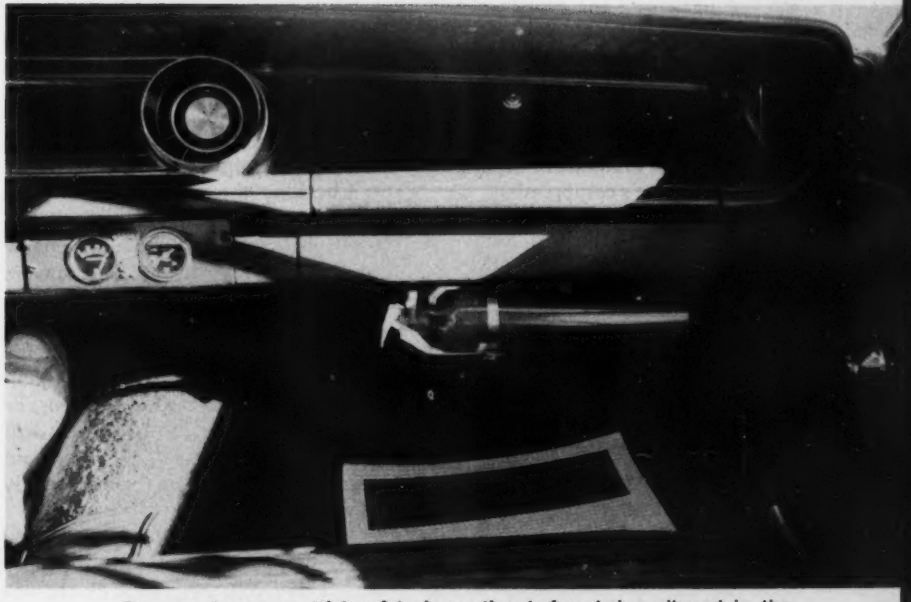
We're also sure that with the careful preparation that makes him a record-setter, Fred Elsass will be running strong at the finals. And if at all possible, DRIVER will be there to bring you a report on how the finals and Fred Elsass went.

(right)
Elsass's record-setting 283 cu. in. Chevy.

(near right)
It takes a lot of people to set a national record, especially a cooperative family and friends and helpful sponsors like the local AAMCO transmission shop and Air Force Association Chapter 283 of Abilene, Texas. Here Dennis Quigley, Elsass's pit crew, prepares to mount the racing slicks.

(far right)
Every drag racer uses jack stands. Anyone caught in the pits with a raised car not supported by stands is ejected from the pits and barred from competition.

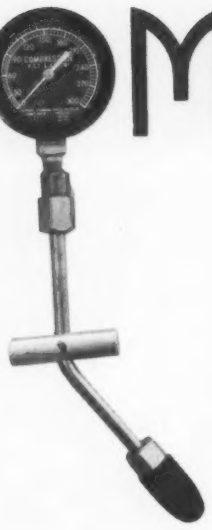
Elsass doesn't touch an engine without one of his carefully prepared checklists. Precise work is what makes a strong-running drag racer, just as it makes for a good-running street car, Fred Elsass emphasizes.



Fred Elsass watches intently as an NHRA official checks the cylinder head capacity. A record-setting engine must be torn down and checked for illegal engine modifications before the record becomes official.

Cars must pass a strict safety inspection before being allowed in the pits. A fire extinguisher is mandatory in most classes.

COMPRESSION CHECK



Engine Compression tells a lot

In the first part of our basic tune-up article in the July '74 DRIVER we mentioned the importance of regularly performing a compression test. However, we only discussed the rather inaccurate quick-check method of doing this. So this month we'll discuss a couple of the common methods of accurately testing an engine's compression.

Proper engine compression is important because the cylinder's fuel charge must be squeezed into the combustion chamber at the correct pressure to ignite and burn at best efficiency. Since compression results from the piston forcing the fuel charge into the combustion chamber, properly sealing piston rings and valves are essential for good compression.

Low compression, which is generally caused by leaking rings or valves, results in an engine power loss. This is because the combustion leak allows parts of the fuel charge to escape from the cylinder before ignition, and the remaining part of the charge doesn't fire at the correct pressure. But besides indicating the cause of poor engine performance, a regular compression check is important because an engine can be damaged when run with low compression.

GAUGE

The most common method of checking engine compression is with the widely available compression tester or gauge. A simple compression gauge (see photo) can be picked up at most discount or auto stores for less than $5. But the slightly more expensive models that have a flexible connector hose are a bit handier to use on most engines.

Checking the compression with a gauge is quite easy—especially if you use a helper. First warm the engine to operating temperature and remove all of the spark plugs. Be sure to label where each plug wire fits if there is any chance of crossing the wires when you reinstall them. Finally, block the throttle wide open (or you can hold the throttle open with the linkage if you have a friend cranking the engine) and you're ready to go.

Insert the gauge into the first plug hole, making sure you have a proper seal. Have your helper crank the engine over with the starter for at least three seconds. Check the reading on the gauge and jot it down on a sheet of paper for later interpretation. Reset the gauge (the reset button is usually located in the end of the gauge) and check the cylinder again just to be sure the reading you obtained was correct. Continue this procedure until you've checked and recorded the compression reading for every cylinder.

INTERPRETATION

After checking each cylinder you can compare the readings with the compression spec given in a manual. Actually the compression in each cylinder is not nearly as important as the variation between cylinders. In fact the compression in some cylinders may be higher than recommended specs because of carbon buildup in the head.

But for the engine to be considered sound there should not be more than a 25 percent difference between the highest and lowest reading cylinder. For instance, if the highest cylinder reads 100 psi then the lowest reading cylinder should have at least 75 psi compression. If there is excessive variation, ring or valve problems are indicated and the engine should be further checked out with the following tests.

First, if two adjacent cylinders read low, then the problem is probably a leaking head gasket. Check the head bolt torque specs in a manual and try retightening the bolts near the leaking

The Backyard Mechanic is designed to serve as only a general guide to the maintenance topics discussed. Since basic procedures vary from car to car, a manual should be consulted when performing any maintenance. And any jobs that the "backyard mechanic" feels are beyond his capabilities should be left to experts.

cylinders—if you don't have a torque wrench, snug the bolts with a standard socket wrench. If the compression doesn't improve after tightening the bolts, you'll have to pull the head to make the appropriate repairs. If the head is removed to replace the gasket you'll probably want to go ahead and have the valves ground at the same time.

One or more nonadjacent cylinders that read low usually have either worn rings or burnt valves. A quick way to determine which problem is causing the leak is to squirt a few ounces of heavy oil (SAE 30 or 40) into the cylinder and immediately retest the compression. A substantial improvement in compression means the rings are worn—the oil temporarily helps the rings seal and boosts the compression. If the reading remains relatively unchanged then a valve is at fault. In the case of a bad valve, it's just a matter of pulling the head and having the valves ground by a machine shop. If you find worn rings, however, this usually involves a major overhaul and may be something you don't want to invest in. In either case it's always a good idea to have the engine checked over by a reputable mechanic. He can further diagnose the engine's problem and help you decide what's the best course of repair action.

PRESSURE CHECK

One final check you can make on a weak cylinder before jumping into

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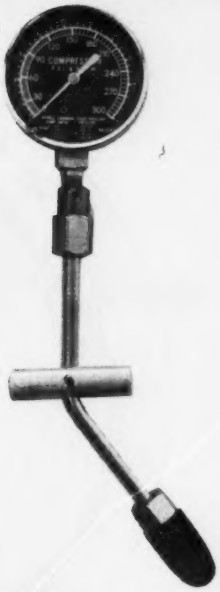
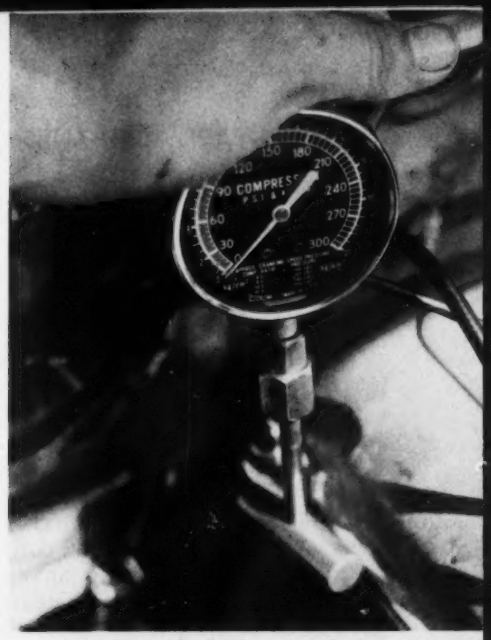
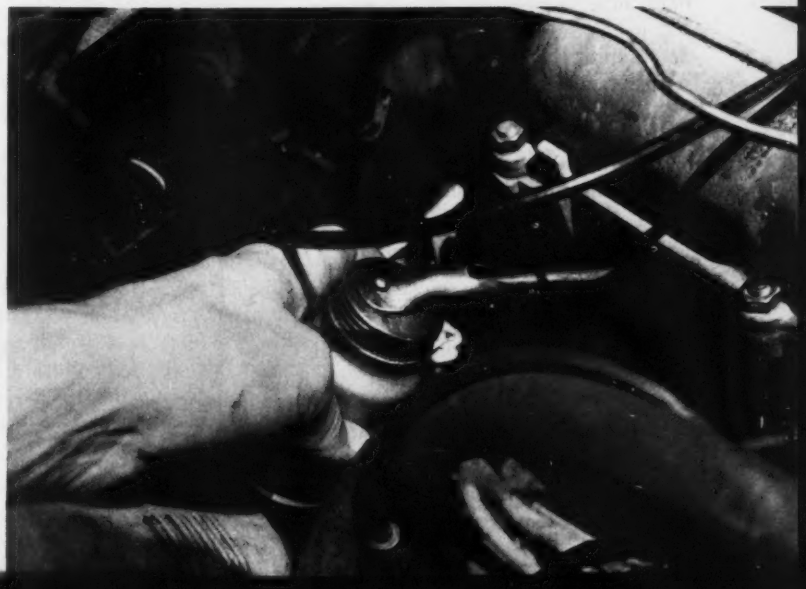


Standard compression gauge.



With all spark plugs removed, the compression gauge is inserted firmly into the plug hole and the engine is cranked over to get a reading.

The gauge must be reset after each test—the reset button is usually located in the end of the gauge.



A low-reading cylinder can be tested by squirting a few ounces of oil into the cylinder. If the compression improves, then the rings are worn. If the reading remains unchanged a valve is leaking.

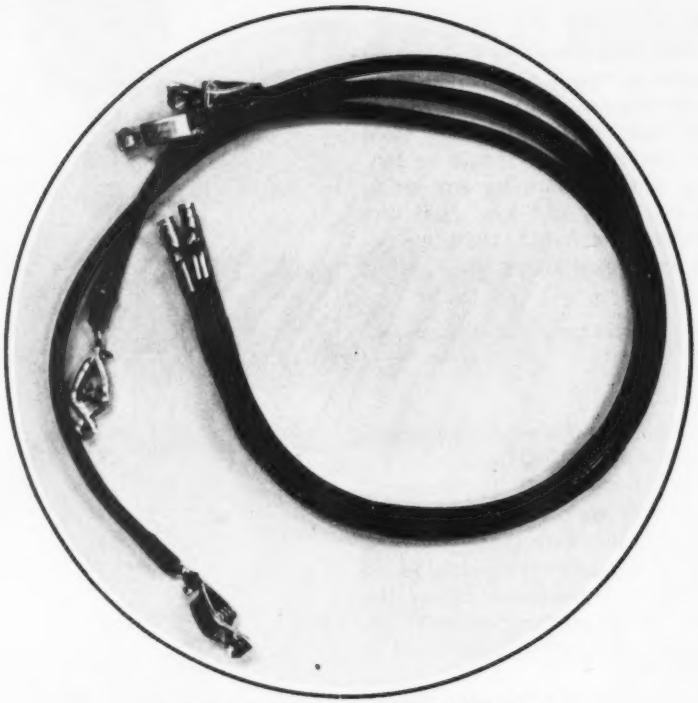
major repairs is an air-hold or pressure test. To do this you'll need a source of compressed air and a special air-hold adapter. The adapters are available at most well-stocked auto supply stores. Also if you don't have a source of compressed air you can check at an auto supply house for a small air pump that operates off the cigarette lighter circuit. These units provide a good supply of air for this particular test and are handy for other purposes.

To perform a pressure test the first thing you have to do is get the piston of the bad cylinder up on its compression stroke so that both valves are closed. You can do this by having your helper crank the engine until the distributor rotor points to the plug wire pick up for that cylinder. With the piston at the top of its stroke, thread the air adapter into the plug hole and apply air pressure on the adapter.

If air flows out of the carburetor —you should hear a hissing sound with the air cleaner removed—then the intake valve is leaking. A leaking exhaust valve is indicated by air flowing out of the tail pipe. If the rings are worn, air will flow out of the oil filler tube. Performing the pressure test in this fashion is the best way of determining the exact cause of a compression leak.

CYLINDER BALANCE

Although the standard compression test is the most common method, many people—especially "backyard mechanics"—prefer running a cylinder balance test to check engine compression. A balance test is quicker and easier and eliminates the hassle of removing the spark plugs on a hot engine. A cylinder balance test consists of running an engine on only two cylinders at a time (the companion



Special spark plug grounding wires can be made from plug cable by simply installing alligator clips on the loose wire ends.

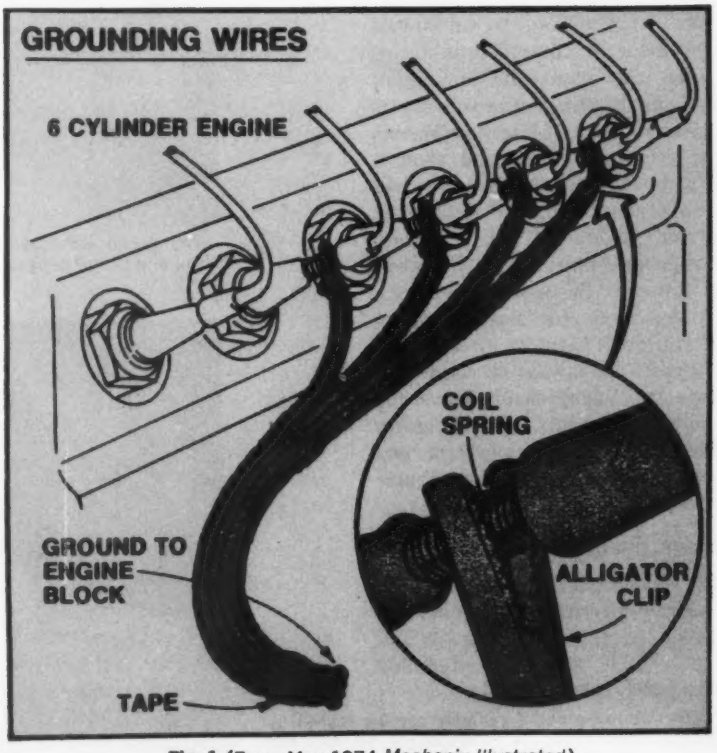


Fig. 1 (From May 1974 *Mechanix Illustrated*)

An air-hold adapter is helpful for tracing source of compression leak.

(From May 1974 *Mechanix Illustrated*)

cylinders) and comparing each pair of cylinders to see if they all have the same power. This is sometimes called a dynamic compression test and is essentially what an oscilliscope does.

The first thing you'll need to do to run a balance test is determine which are the companion cylinders. The companion cylinders are those that are at the top of their stroke at the same time—one piston being on the exhaust stroke and the other being on the compression stroke. Determining the companions is very simple. First look up the firing order of the engine and divide it in half. Then place the second set of cylinders directly below the first cylinders as shown. The ones that line up vertically are the companions. For instance, a four-cylinder engine that fires 1-3-4-2 has companions of $\frac{1\text{-}3}{4\text{-}2}$ or 1 and 4, and 3 and 2. An eight-cylinder engine that fires 1-8-4-3-6-5-7-2 has companions of $\frac{1\text{-}8\text{-}4\text{-}3}{6\text{-}5\text{-}7\text{-}2}$ or 1 and 6, 8 and 5, 4 and 7, and 3 and 2.

There are several methods of shorting out all of the cylinders except the companions to check the power of each companion set. One way to do it is to simply pull off all the spark plug wires except those to the companions with the engine running. However, this procedure has obvious faults—like shocking the daylights out of you. The best way to run a balance test is with a set of grounding wires you can purchase or make from spark plug cable.

To make grounding wires, simply install an alligator clip to one end of the plug cable and a plug wire terminal to the other end. You can also use regular plug wires and simply install a clip to the bare end—one end will have the plug terminal on it (see photo). Since most engines have plastic or rubber insulators over the plugs, you'll also need small coil springs to insert between the plug and plug wire terminal so you can get a contact to short out the plug. Figure 1 should clarify how to make and use grounding wires. Just remember that the wires have to be long enough to reach a common ground on the engine. Also that you'll need six wires to test an eight-cylinder engine and four wires for a six-cylinder.

To run a balance test using grounding wires, simply install the wires on all but the companion cylinders. Start the engine and let it warm while you hook up a tachometer. Then with the engine running properly on every cylinder, ground the wires so the engine runs on only the companions. Check the tach reading and jot it down.

Shut off the engine and move the wires so the next set of companions are not grounded. Start the engine and short out all but the next companions and check the tach reading. Continue this procedure until you've checked every set of companions and compare the tach readings. If the engine is sound, each companion set will run the engine at approximately the same speed. If there is more than 50 rpm difference between any companions, the low-reading cylinders should be checked out with a standard compression check or a pressure test to determine the cause of the cylinder weakness.

One important point on a balance test is that with 1973 and newer cars equipped with the Exhaust Gas Recirculation (EGR) emission system the EGR vacuum line must be disconnected and plugged at the EGR valve to run the test. And on Chrysler products with the internal EGR system the balance test cannot be performed.

So a balance test is probably the handiest way to run a compression test. After you get a set of grounding wires made it is quick and easy to run the check. Another easy way to get a compression test is with a scope check at a diagnostic tuneup shop. But whatever method you use, a frequent compression check—at least at every tuneup—is important to make sure your car's engine is operating at top efficiency. And by keeping tabs on the internal condition of your engine you can have compression problems taken care of before they develop into more costly engine problems.

BACKFIRE

WHAT BIKINI?

I wish to take exception to the photo and caption pertaining to SCUBA diving in your July issue.

Unquestionably SCUBA should be learned only from a qualified (and certified) instructor, but having just been trained in the very open water of the Pacific Ocean, I feel a much more capable beginner than a pool-trained individual. This training was received at Hulopoe Bay, Lanai, Hawaii, from YMCA-certified instructors as part of a Sierra Club outing. I highly recommend it.

The photo also leaves a bit to be desired. I was trained to always wear a life vest (or better yet a bouyancy compensator), never put the mask on my forehead where it can be knocked off by a wire (and also fog up) but to lower it to around the neck, and to place the snorkel on the left as a SCUBA regulator comes over the right shoulder.

Perhaps the bikini so dazzled you that the technical aspects were overlooked?

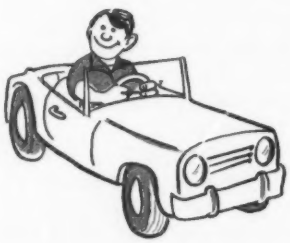
Col William C. Ferguson
Ent AFB, CO 80912

We did not mean to imply that training should not take place in the ocean but merely that it should begin in a pool where the instructor has better control. So far as the bikini is concerned, the managing editor selected those pix and she didn't even notice it!

INSURANCE RATES

Regarding your "Opinions" question on insurance rates, I know insurance companies deal in statistics but why not give the new driver a one-year trial period at a higher rate and then have a flat rate regardless of age, sex, type of car, etc.? Then have a closer working relation with law enforcement groups and hit the person for say 10% for a moving violation and maybe a 50% increase for offenses like speeding by more than 15 mph, or reckless driving or DWI.

I've owned more hot cars than most people and have been racing for over 18 years. Round track, drags, motorcycles, from Daytona to Riverside,



and I've even managed a couple of National Drag records and a group of local track records. But let me mention that to my insurance man and he starts drawing flight pay. I've never had a moving violation, I've never had a chargeable accident, and I haven't even scraped the paint on one since '63.

So give the kids a break and let them prove they are good, and make it so expensive the bad driver can't afford to drive. Keep up the good work on a great mag.

TSgt James R. Godfrey, Jr.
640 MS
Reese AFB, TX 79401

FROM THE PET STORE

I would like to pass along a helpful suggestion to your readers in regard to the April "Backyard Mechanic." When bleeding wheel cylinders, I have found that instead of using an ordinary rubber hose to transfer the fluid coming out to a container, use a piece of clear plastic tubing which

can be bought at any pet supply. (It is used for air lines on aquariums.) By using the clear tubing you can *see* the air bubbles in the line and when the air bubbles are gone, you can *see* the line is clear.

Sgt Gary L. Steitz
144th Combat Support Sq
California ANG
Fresno, CA 93727

COOLING IT

I am writing about the June article dealing with cooling systems. Although I thought it was a good article,

I believe you omitted a step in the flushing process. Since the heater core is part of the cooling system, your

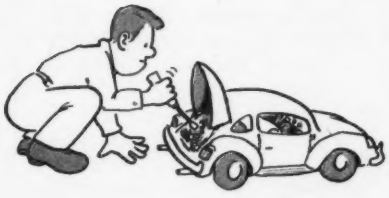
heater should be turned on full blast as you flush the system and also as you are installing new anti-freeze.

Also, here's a trick I use when I'm in a traffic jam and the motor is getting on the warm side: Turn your heater on full. The reason is that your heater core acts like a little radiator and assists the main radiator in dissipating heat. You might get warm, but that's better than "cooking" your motor and it will bring the engine temperature down some.

L/Cpl Ron A. Boettin
Marine Barracks
Naval Ammo Depot
Hawthorne, NY 89415

"BACKYARDING" ON IMPORTS

Just a note to say I thoroughly enjoy your magazine. I look forward to each month's issue and I particularly like the "Backyard Mechanic" since I've been one for several years. The average person can save many hard-earned dollars by performing for himself the various maintenance and mechanical tasks your magazine outlines so well.



A suggestion: Readers might find very helpful some servicing and maintenance procedures that deal primarily with the more popular foreign cars such as VW, Datsun, Toyoto, etc.

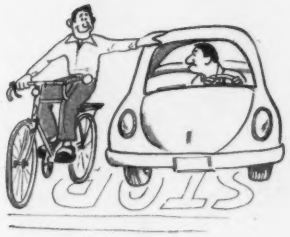
Capt A. R. Stout
2160 Bancroft Dr
FPO San Francisco 96615

We had to give our Backyard Mechanic some leave and he is currently hiking around the Idaho wilderness, but when he gets back to his typewriter and tool kit we'll pass along the suggestion.

PEDALING ALONG

Your excellent article on biking in the May issue should do much to further biking as a sport and for useful transportation; however, you might have given the wrong impression about brakes and toe straps.

Side-pull caliper brakes exert equal pressure on both sides of the rim, just as center pull brakes do. Any difference in performance between the two types is more likely to be due to the



quality of the brake and the attention it receives than to its design. The center-pull design possibly is easier to adjust.

Steel toe clips and leather straps should never be so tight the rider cannot readily remove his foot in an emergency. There is no reason to use only one if the rider is sufficiently experienced and skilled to use them at all. It is probably better not to use them if one rides mostly in heavy traffic. Like 10-speed bikes, toe straps are only needed for serious riding.

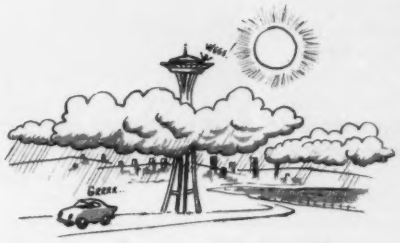
C. W. Bentson
Hq ECA/DE, Box 4834
APO New York 09633

We regret the garbling of our sentence about caliper brakes and thank all you bikers who wrote us about it.

DRIVING IN SEATTLE

I want to thank all individuals involved for constructing such an informative and easy-to-read magazine as the DRIVER. Particularly interesting in the June edition was the article, "Driving in Seattle." Washington being my home state, and being familiar with the Seattle area, many points of interest were covered that I myself am aware exist. I'm looking forward to part two.

SP/4 Gary Wilburn
Transportation Office
Ft. Greely, AK 98733



MORE ON SEATTLE

Just being picky this morning but I have come across a psychological error, I think, in your June article about driving in Seattle. The story states that the advice of the Seattle Police is to always follow the rule that traffic coming from the right has the right-of-way. Now that is good advice but I'll bet a nickle that the law doesn't say that. I think it says that the traffic on the left must yield to the traffic on the right.

It's a small point but one which is carefully structured to prevent the law from giving right-of-way to anyone. Psychologists believe it is dangerous to give the right-of-way to anyone by law because some fools will take it.

Anyway, the point of my writing is to compliment you on a fine magazine that is doing a good job. . . .

Charles H. Ernst
USA Training and Doctrine Command
Fort Monroe, VA 23651

Right you are about the right-of-way.

Address your letters to:
Editor
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

continued from page 2

Double Clutch

Air Force cyclists consistently wear gloves and only about a quarter use leather jackets.

This was strictly an Air Force survey, but we suspect that the ownership figures for Navy people would be even higher because of their opportunity to buy and ride cycles while in foreign ports, and then bring them home.

One thing is for sure: Interest in motorcycles is growing among service people at an even greater rate than among the general population.

Wet Waxed Windshields

The National Highway Traffic Safety Administration has warned motorists that the liquid car waxes used in many automatic car-wash establishments can smear the windshield, becoming "a sudden hazard, impervious to wiper actions" when mixed with rain or road grime.

The agency has issued a driver "alert" urging motorists to clean the wax film from both the glass and the windshield wipers using household window cleaning products immediately after any wax application. The agency does not plan to urge states to take any action on the problem, nor does it plan to urge car washes to clean the spray wax from car windows.

Change in Lights

Some 1975 cars will have rectangular headlamps and in the near future some General Motors cars will have full-time running lights, according to a recent article in **Automotive News.** The National Highway Traffic Safety Administration recently approved the use of the rectangular lights which have appeared on cars in Europe for a number of years. The lights will be 4 inches high and 6.5 inches wide. The full-time running lights would go on when the ignition key is turned on in cars with four headlamps. A separate filament in the two inboard lights would function day and night as a caution to other drivers.

About Miss DRIVER

Brown-eyed Colleen Chaffee, who goes by the nickname of Bonnie, is the daughter of an Air Force officer so she has traveled widely and never gets tired of it, although she prefers to have someone else do the driving. She enjoys part-time modeling and would like to develop it into a full-time career. Her hobbies are dancing and horseback riding.

More About Miss Driver

The Director of Aerospace Safety recently received some official correspondence criticizing our magazine's use "of photographs of partially dressed young women to attract attention."

The correspondence went on to say that "such photographs are offensive to a major segment of our population" and that their use "appears to be limited exclusively to Air Force safety periodicals." It also said that the "situation is now out of control and the proliferation of such illustrations and photographs is self-defeating and serves no useful purpose."

We ask you readers to drop us a post card or note telling us how you feel about this matter. Do you find our photos offensive? Do you read Miss DRIVER's safety messages? Would you say that our photographs of young men and women show them "partially dressed," or do you wear similar attire or see it being worn by your contemporaries in public places?

Everyone who reads this is urged to send us comments, but we are particularly interested in hearing from men and women who are 18 to 26 years old, in any branch of service. It's your magazine, how do you want it?

Our address is
AFISC/SED, Norton AFB, CA 92409.

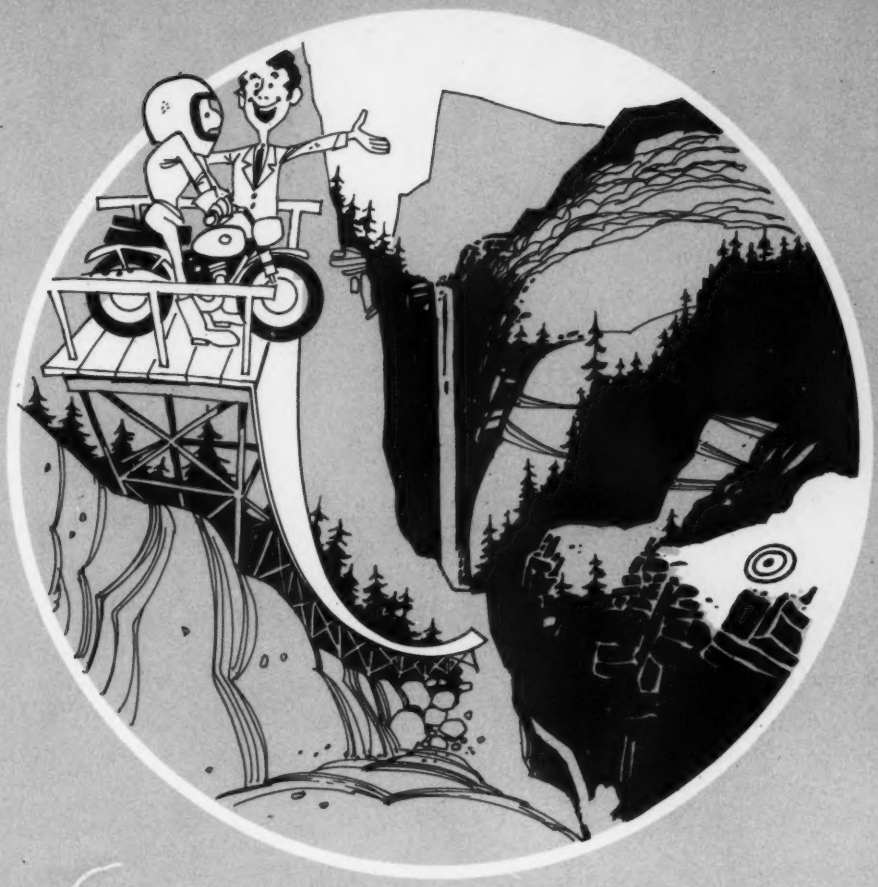
The Backyard Mechanic

Your requests for our special printing of "The Backyard Mechanic" have overwhelmed us, and our supply is exhausted. We hope to obtain one more press run to fill the requests now on hand, so if you have written but haven't heard from us yet, please be patient. Thanks to all you readers for your interest in this series. Frankly, we were amazed at your response.

☆U.S. GOVERNMENT PRINTING OFFICE: 1974—789-877/13

TUNEUP

CAPTION CONTEST WINNERS



1ST PLACE

Sgt Lorin F. Owen
6570 ABGP
Brooks AFB, TX 78235

"You should have thought of that when we were down by the restrooms!"

2ND PLACE

SMSgt Rieker
57 CSG/OTGA
Nellis AFB, NV 89191

"One more run to make and you qualify for your base decal."

3RD PLACE

SSgt R. Colbeth
438 ABGP (DPMS)
McGuire AFB, NJ 08641

"O.K., got it straight? Halfway down face left toward the cameras, paunch in, chest out. Cut the throttle for a sec to keep the audio people happy. We had to move the ramp a little for better lighting. . . ."

HONORABLE MENTION

Everybody
67 CSGp/DPMS
Bergstrom AFB, TX 78743

AN Tom Timmons
USS Coral Sea
FPO San Francisco 96601

Vernon E. Byrd
Naval Ordnance Laboratory
White Oak, Silver Spring, MD 20910

Captain James L. Lorr
7519 CSS/SEG
APO New York 09048

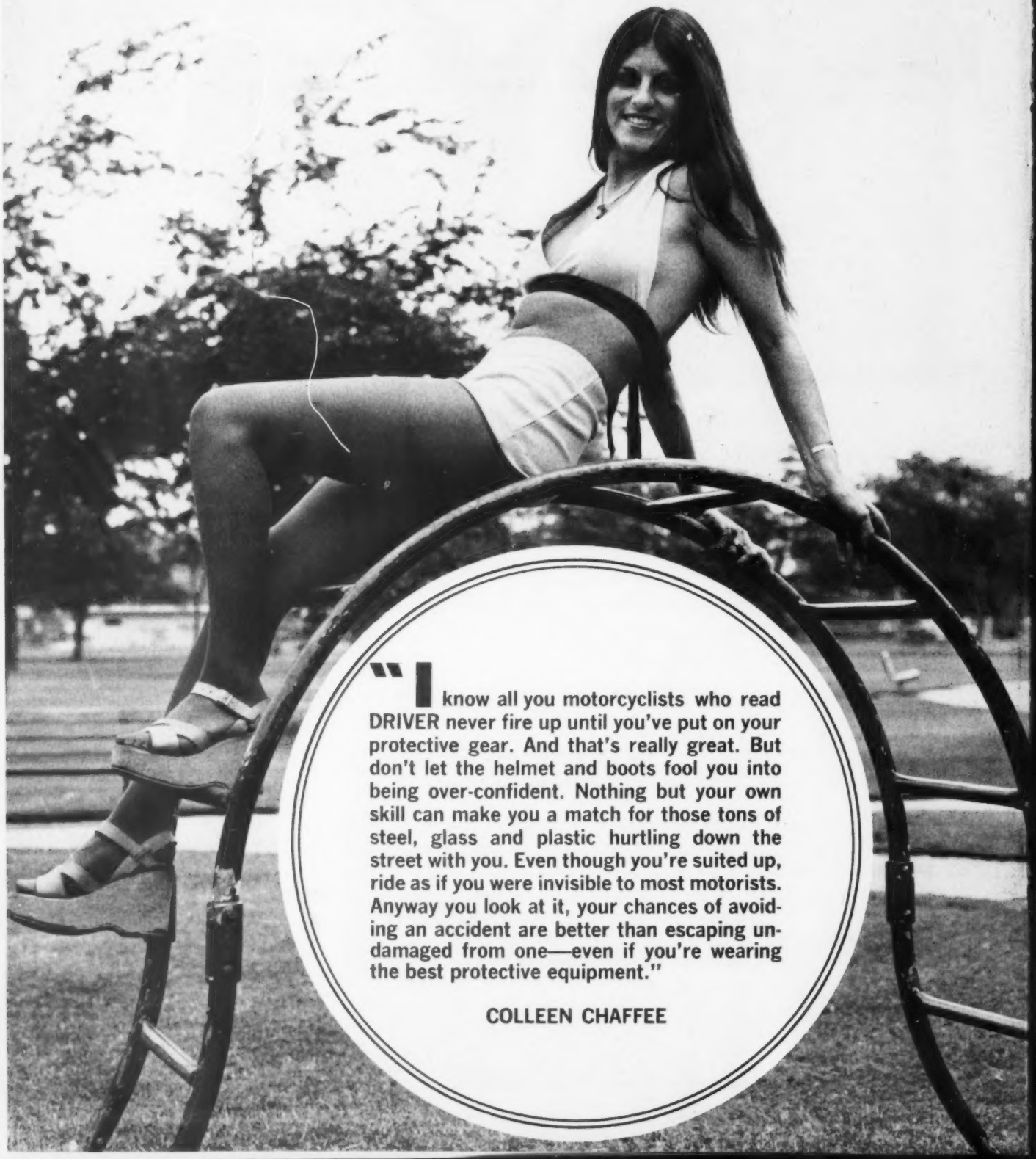
SSgt William H. Adkins
MWSG-27, 2nd MAW
MCAS, Cherry Point, NC 28533

YN1 Larry W. Henry
CINCPAC Staff
FPO San Francisco 96610

Mary Ann Addison
1928 Comm Gp/CC-S
MacDill AFB, FL 33608

MSgt Bob Edridge
3550 White Plains Rd
Bronx, NY 10467

Miss DRIVER



"I know all you motorcyclists who read DRIVER never fire up until you've put on your protective gear. And that's really great. But don't let the helmet and boots fool you into being over-confident. Nothing but your own skill can make you a match for those tons of steel, glass and plastic hurtling down the street with you. Even though you're suited up, ride as if you were invisible to most motorists. Anyway you look at it, your chances of avoiding an accident are better than escaping undamaged from one—even if you're wearing the best protective equipment."

COLLEEN CHAFFEE